

Reclaimed Water Feasibility Study

March 2008



Irrigating sports fields



Irrigating golf courses



Water for nursery plants



Enhancing wetlands



Industrial processes



Reclaimed Water Feasibility Study

MWPAAC Engineering & Planning Subcommittee

May 7, 2008

Today's Presentation

- Overview of Final Report, including purpose of study and context
- Chapter Highlights
- Key Findings of Study
- Next Steps

Purpose of Study Outlined in RWSP Water Reuse Policy-2

WRP-2: By December 31, 2007, the King County executive shall prepare for review by council a reclaimed water feasibility study as part of a regional water supply plan which will include a comprehensive financial business plan including tasks and schedule for the development of a water reuse program and a process to coordinate with affected tribal and local governments, the state and area citizens. The reclaimed water feasibility study shall be reviewed by the RWQC. At a minimum the feasibility study shall comply with chapter 90.46 RCW and include:

1. Review of new technologies for feasibility and cost effectiveness, that may be applicable for future wastewater planning;
2. Review of revenue sources other than the wastewater rate for distribution of reused water;
3. Detailed review and an update of a regional market analysis for reused water;
4. Review of possible environmental benefits of reused water; and
5. Review of regional benefits of reused water.

Contents of Study

Feasibility Study Chapters:

1. Introduction
2. History and description of King County reclaimed water facilities and program
3. *Review of reclaimed water technologies*
4. Economic framework for assessing projects
5. *Review of revenue sources for distribution of reclaimed water*
6. *Review of environmental benefits & regional benefits of reclaimed water*
7. *Review and update of a regional market analysis for reclaimed water*
8. *Business plan for existing reclaimed water program*
9. Next Steps: Regional Reclaimed Water Comprehensive Plan

Context and Directives

- Builds on earlier studies and plans: 1995 feasibility study, 2000 work plan, 2005 white paper, regional water supply planning
- 1999 RWSP policies and KC Comp Plan
- State legislation in 1992, 2006, 2007
- Puget Sound initiatives
- KC Executive Orders on Climate Change

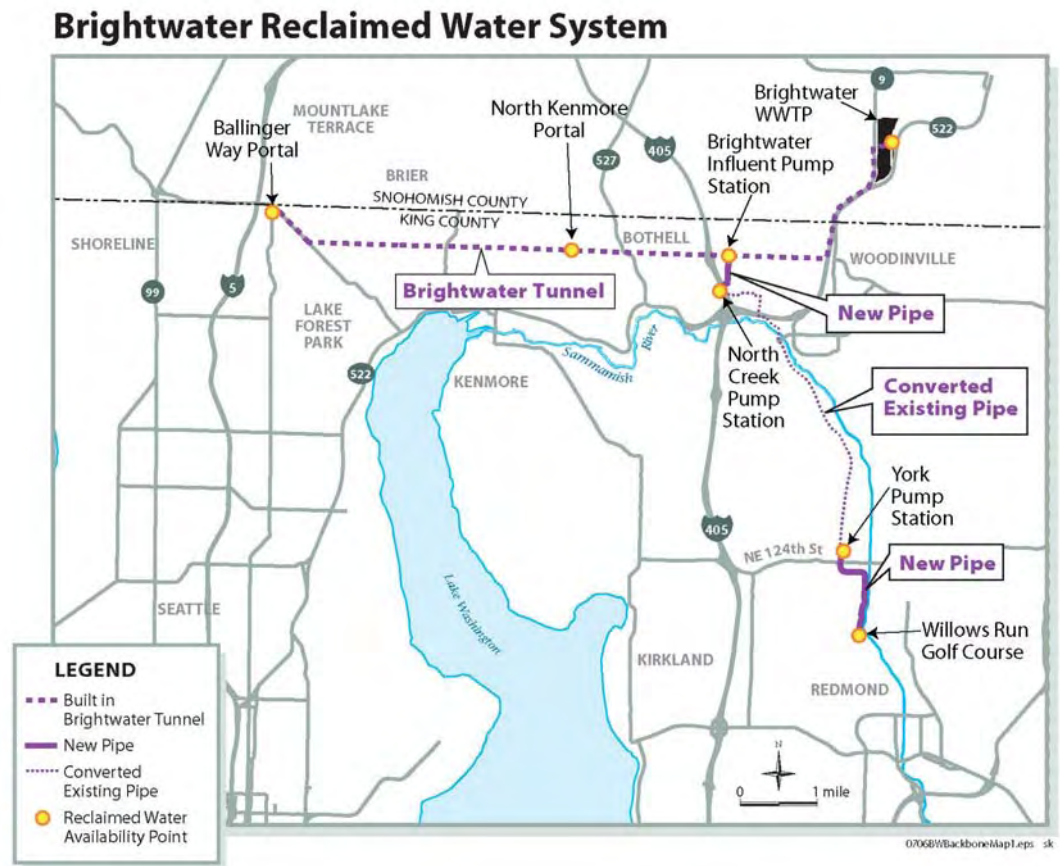
Existing Reclaimed Water Program

- Since 1997, reclaimed water has been produced and used at West Point and South Plants
- 255 million gallons of reclaimed water produced and used annually
- Offsite uses from South Plant
 - City of Tukwila irrigates Fort Dent Park with reclaimed water (irrigation began in 1998)
 - City of Tukwila will be irrigating Foster Links Golf Course by 2009



Existing Reclaimed Water Program (continued)

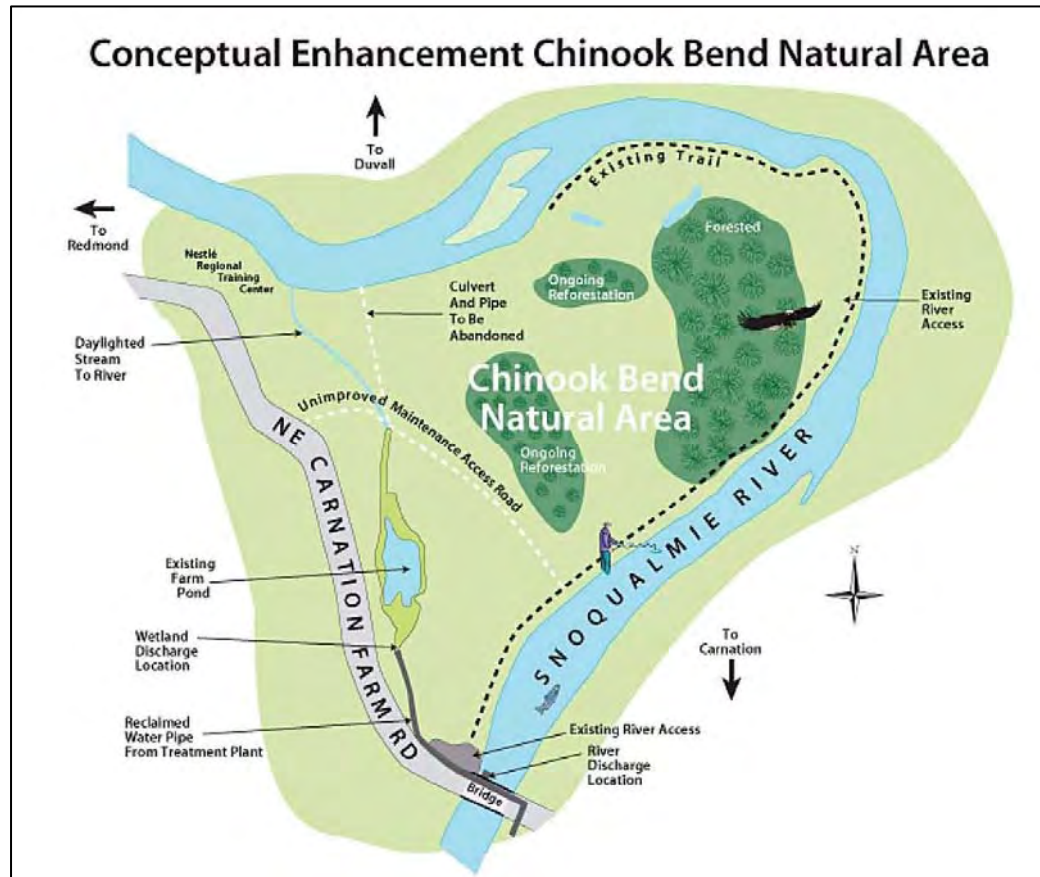
- Brightwater efforts under way
 - Identifying & working with potential customers to be served by the south leg, such as the City of Bothell
 - Coordinating with Willows Run to ensure a smooth startup and operating program



Existing Reclaimed Water Program (continued)

Carnation Treatment Plant Wetland Discharge

- Plant startup in May 2008
- Transition to wetland discharge within 8-12 months of start-up



Existing Reclaimed Water Program (continued)

- Research and Demonstration
 - South Plant greenhouse for demonstration
 - Research studies under way by University of Washington to provide information that customers need

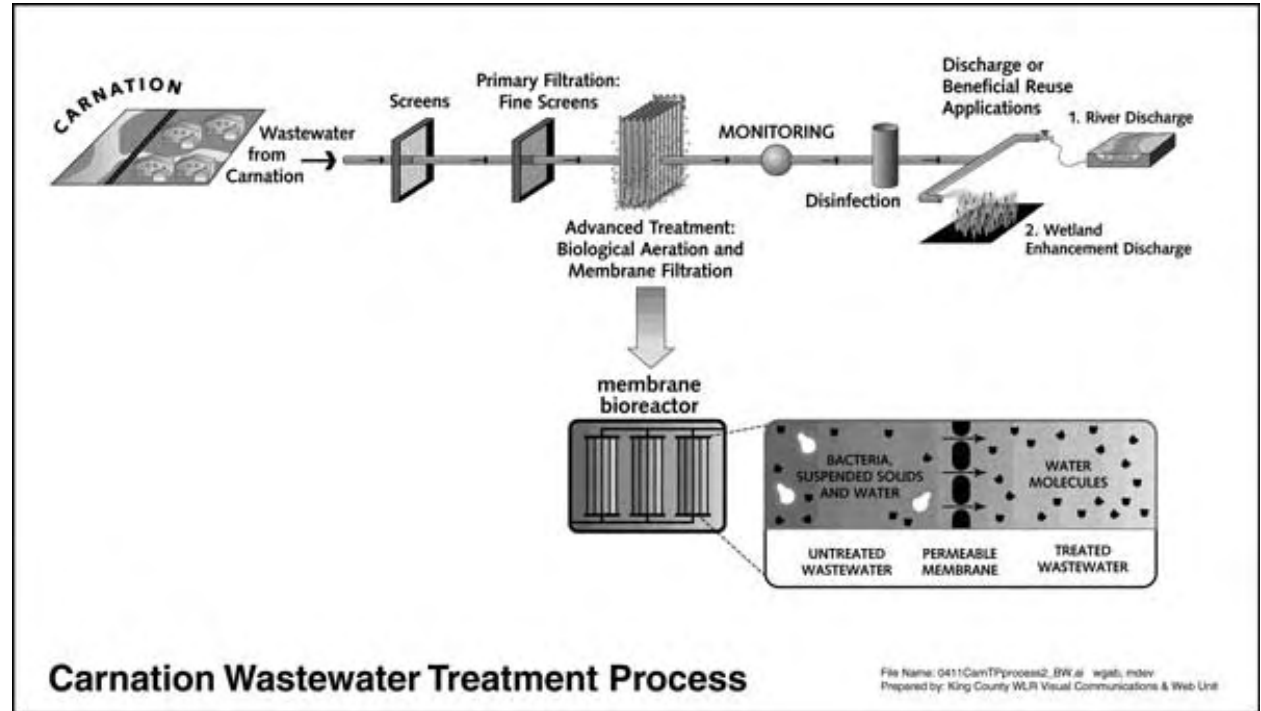


Review of Technologies

- Methodology: Case studies, cost curves for various treatment combinations
 - Interviews with 15 reclaimed water producers in WA State
 - Surveyed 17 reclaimed water producers in CA, NV, FL, AZ, CO
- Technologies researched: sand filtration, micro-and ultra-membrane filtration, ultra-filtration/reverse osmosis, membrane bioreactor (MBR), chlorination, UV, UV/hydrogen peroxide, ozone
 - Most reclaimed water facilities constructed in 1990s added filtration and disinfection units to secondary treatment units
 - Facilities constructed since 2003 or are under design use/plan to use MBR technology and UV disinfection

Review of Technologies (continued)

- Sand filters at West Plant & South Plant
- MBR for Brightwater and Carnation
- Review confirmed that King County's technologies are appropriate for serving potential uses in foreseeable future



Review of Revenue Sources for Distribution

- Methodology: Case studies (WA, AZ, CA, FL)
- Potential options for financing and funding capital costs:
 - Low-interest loans and grants
 - Voter approved taxes
 - User fees and capacity charges
 - Developer contributions and latecomer agreements
 - Separate reclaimed water utility
 - Environmental credits
 - Voluntary customer contributions collected through water or wastewater bills
- Potential incentives include: tax breaks, higher fees for wastewater disposal, surcharges on water withdrawals from critical groundwater or surface water sources

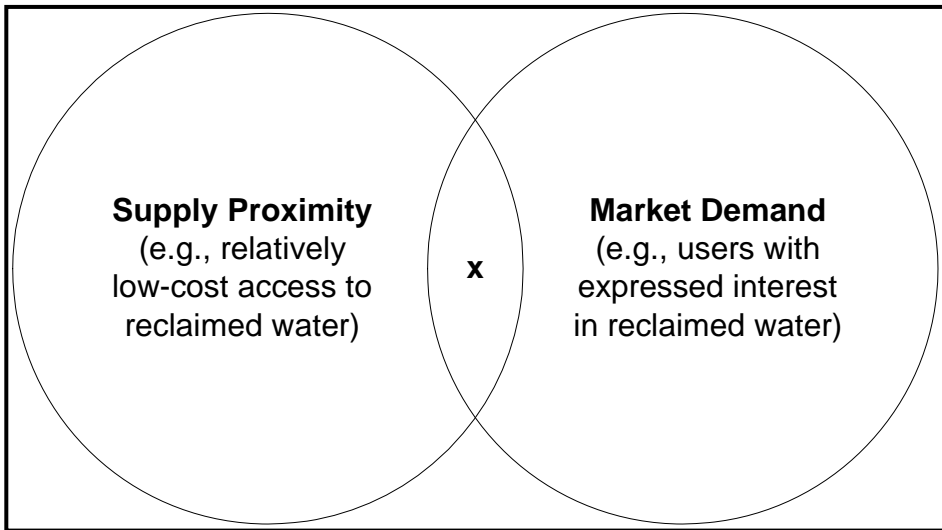
Review of Revenue Sources for Distribution (continued)

- Highlights from case studies
 - Project drivers: avoiding/reducing effluent discharge or providing additional water supply
 - Capital costs financed through combination of low-interest loans, grants, and bonds
 - Cost recovery methods: reclaimed water rates; property taxes and delivery charges; or wastewater and/or water rates
- Overall findings
 - Cost recovery methods and period over which costs are recovered are policy decisions
 - Difficult to recover 100% of reclaimed water costs solely from users

WaterReuse Foundation Economic Framework

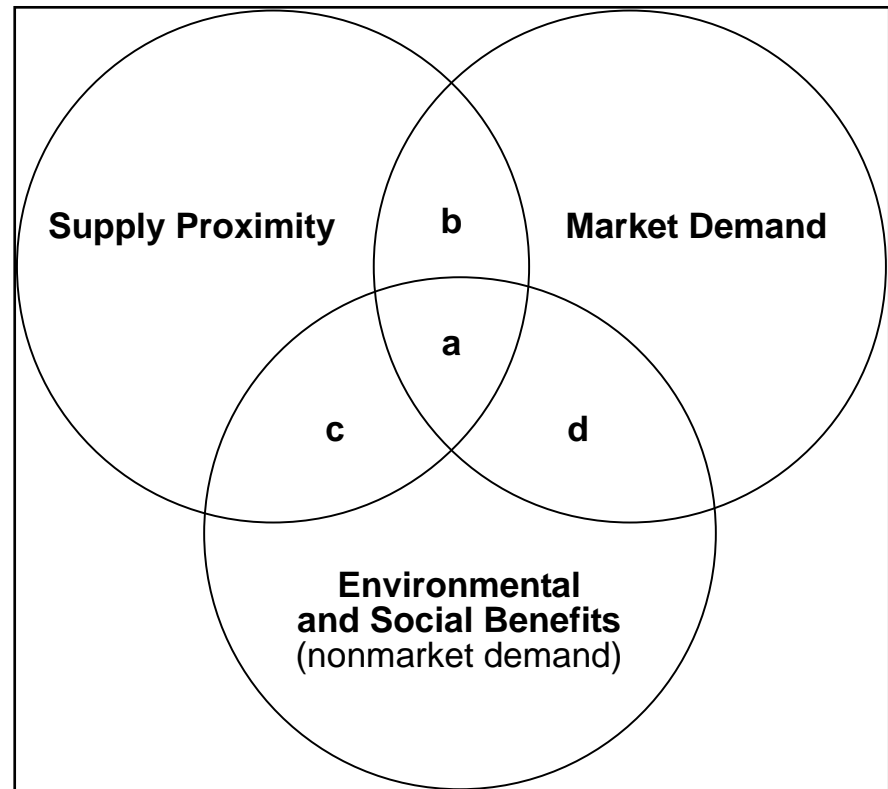
- Economic analysis tool for evaluating benefits and costs of reclaimed water projects
- Considers both the benefits and costs of producing and using reclaimed water
- Helps inform decisions about potential future investments in reclaimed water or other elements of a water resource management program
- By identifying and quantifying the range of benefits of a project and the groups that would receive the benefits, framework can help answer questions about who should pay, how much, why

Economic Framework for Assessing Reclaimed Water Projects

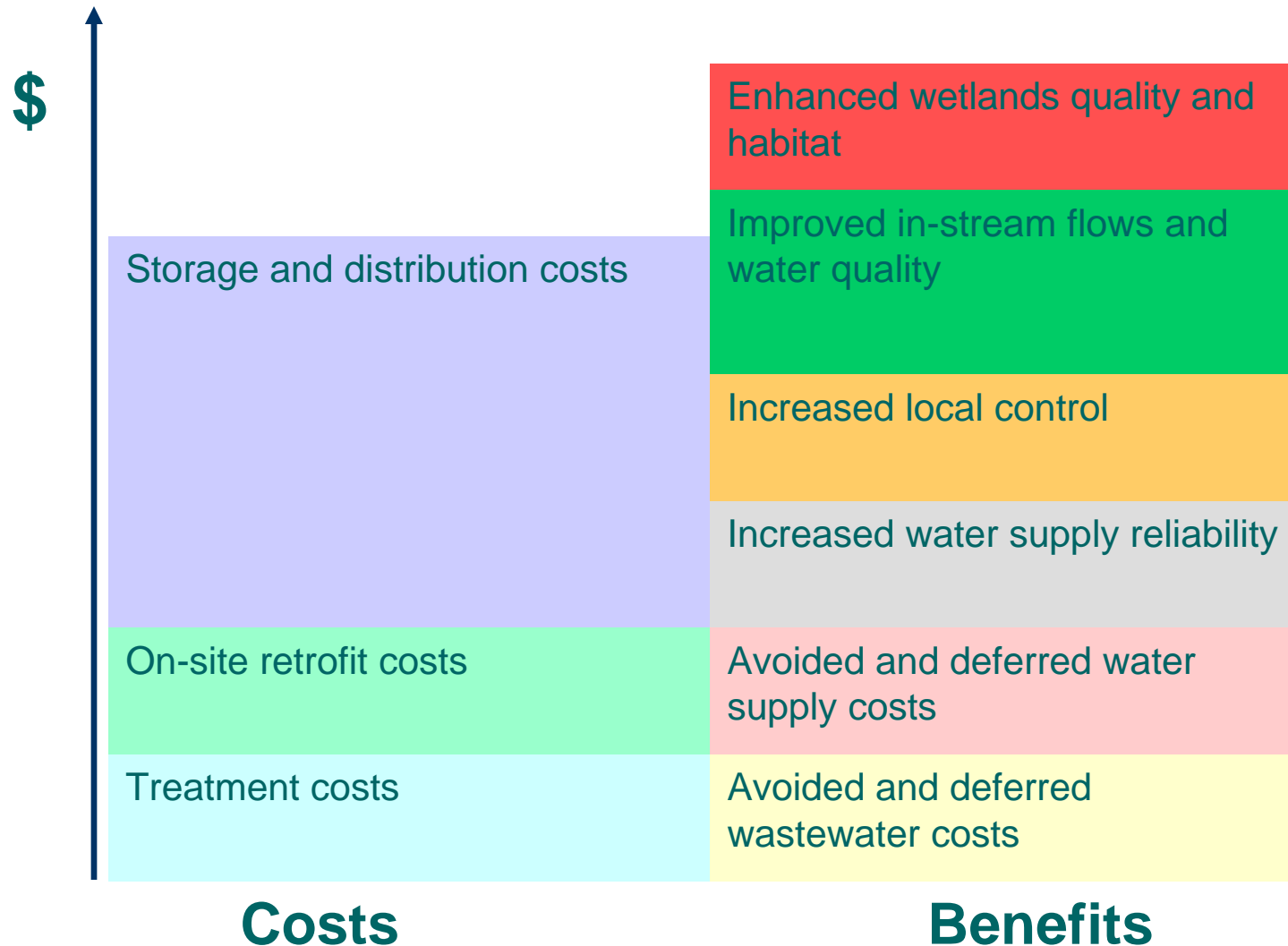


Traditional market-oriented reclaimed water program development – focusing on internal financial factors only

WRF Approach: Value-oriented reclaimed water program development – both external and internal economic factors considered



Considering Costs and Benefits



Review of Environmental and Regional Benefits

- Methodology: Followed benefit-cost guidelines of WRF Economic Framework
- Defined baseline and alternative futures that could affect it
 - Status Quo + growth
 - Climate Change
 - ESA/Ecosystem Stress
 - Puget Sound Wastewater Management

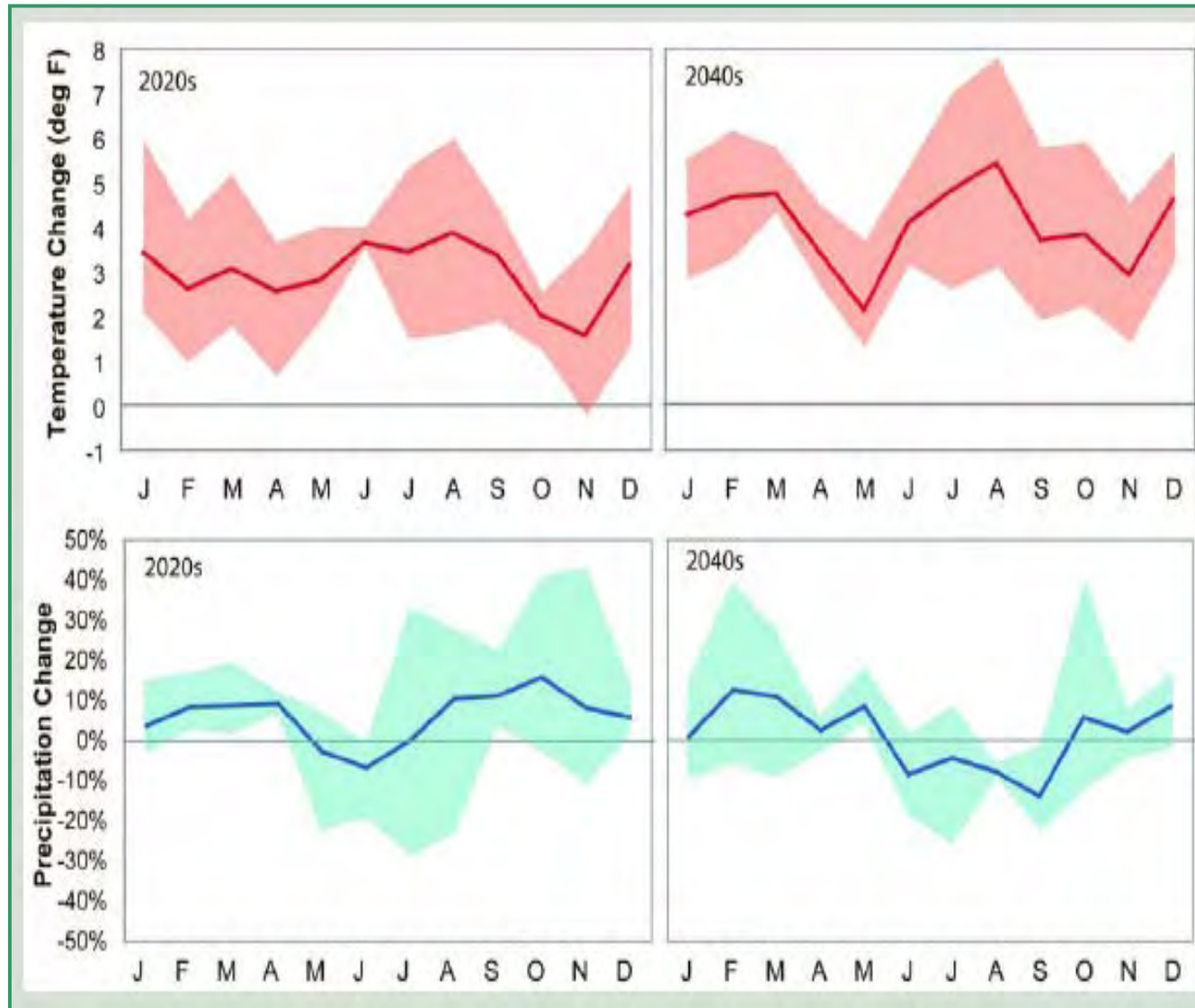
Review of Environmental and Regional Benefits (continued)

- Environmental Benefits
 - Contribute to Puget Sound recovery efforts by reducing discharges to Sound
 - Enhance streamflows and wetlands
 - Improved fisheries and riparian ecosystems
 - Improved instream water quality and quantity
 - Improved groundwater quality and quantity

Review of Environmental and Regional Benefits (continued)

- Social Benefits
 - Meet region's environmental ethic for recycling and implementing "waste is a resource"
 - Help prepare for climate change: adds economic reliability as climate-independent water resource
- Financial Benefits
 - Avoided/postponed costs for additional wastewater infrastructure
 - Avoided/postponed costs for adding new potable supplies
 - Reclaimed water revenue

Projected Changes in Monthly Temperature and Precipitation in Pacific Northwest for 2020s and 2040s

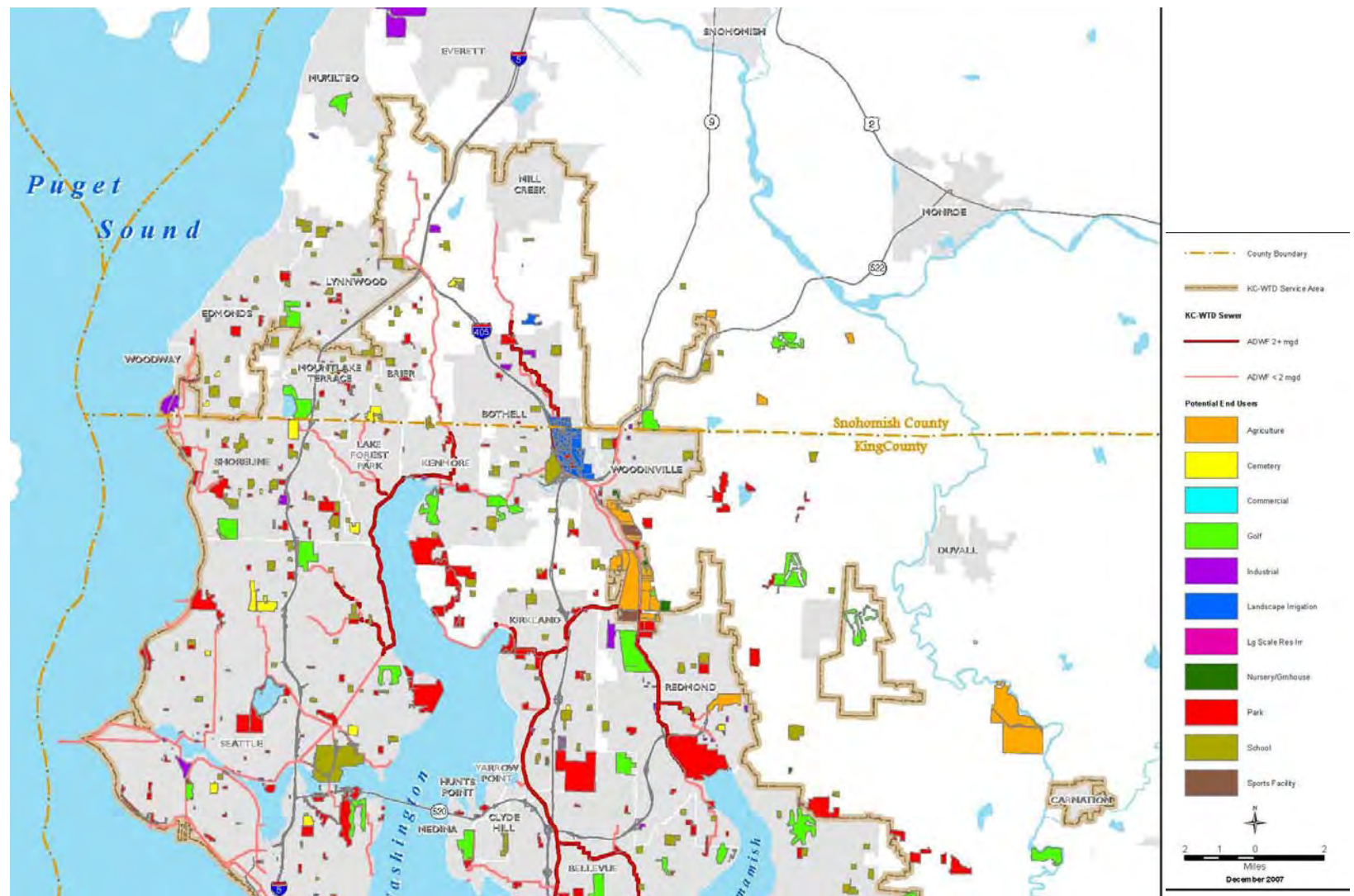


Regional Market Analysis Update

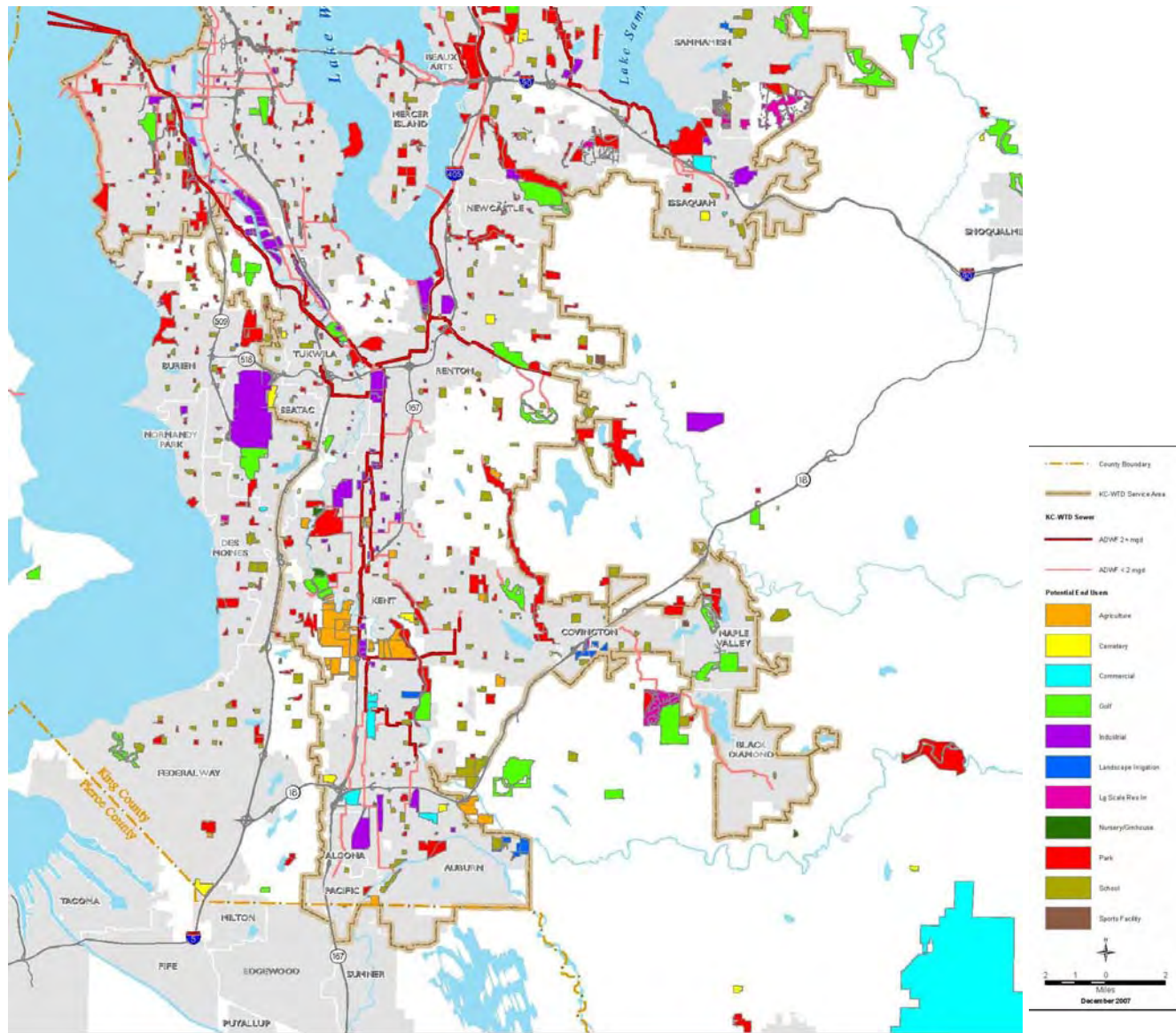
- Key Assumptions:
 - KC produces reclaimed water and wholesales it to local utilities: **the customers**
 - Utilities provide reclaimed water to **the users** in their service area.

Regional Market Analysis Update

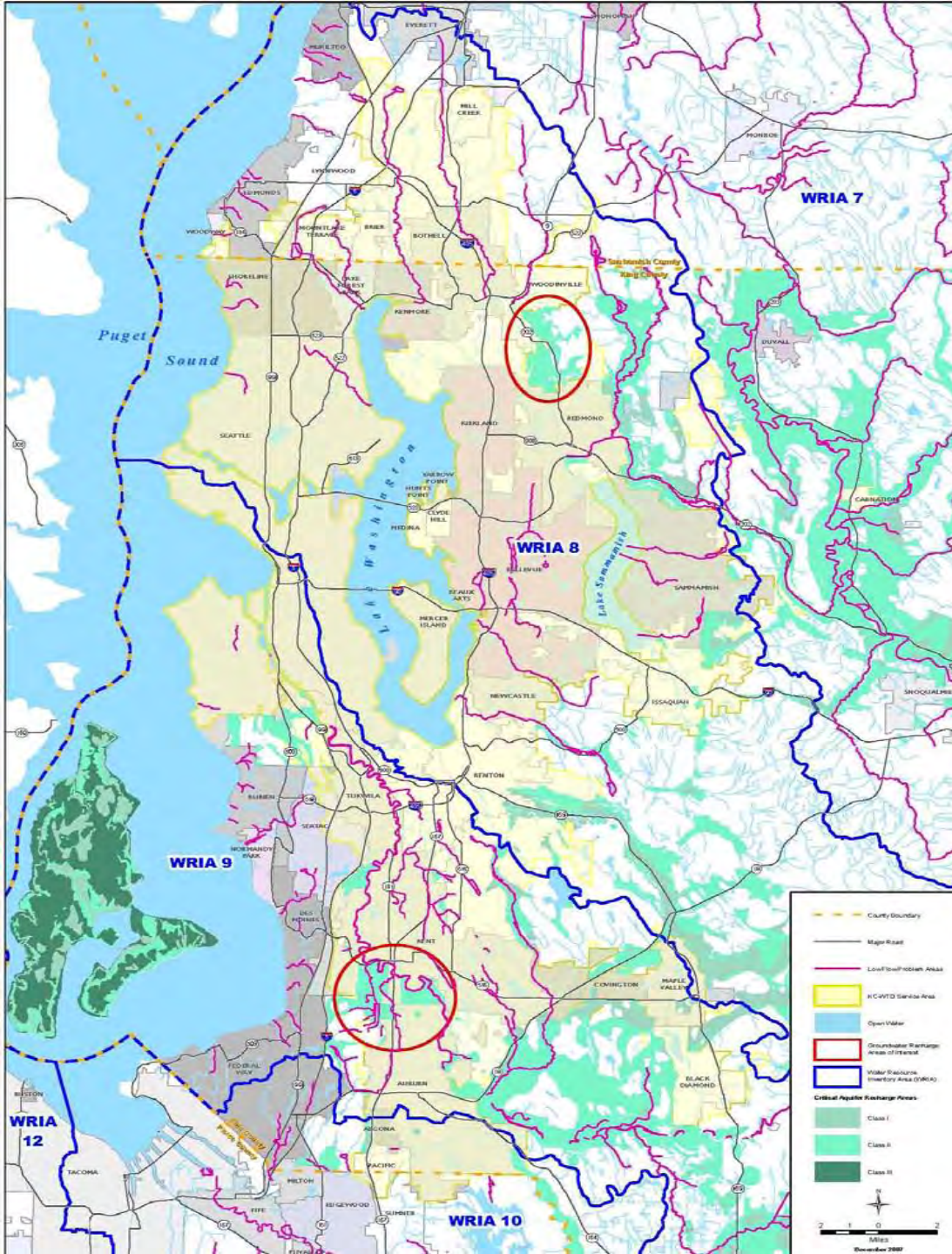
- Methodology: Customer interest (19 local agency interviews), user opinions and public perception (focus groups, surveys)
Land use (GIS), environmental needs
- Highlights from agency interviews
 - Various levels of interest – some agencies want reclaimed water now, some don't see a need for 20+ years
 - Cost is the number one decision-making concern
 - Wastewater rates should not be the only source of funding for reclaimed water infrastructure
 - Reassurance about safety of using reclaimed water is key
 - A comprehensive program of public education and awareness is imperative



Potential Reclaimed Water Irrigation Users In and Near King County's Service Area (North)



Potential Reclaimed Water Irrigation Users In and Near King County's Service Area (South)



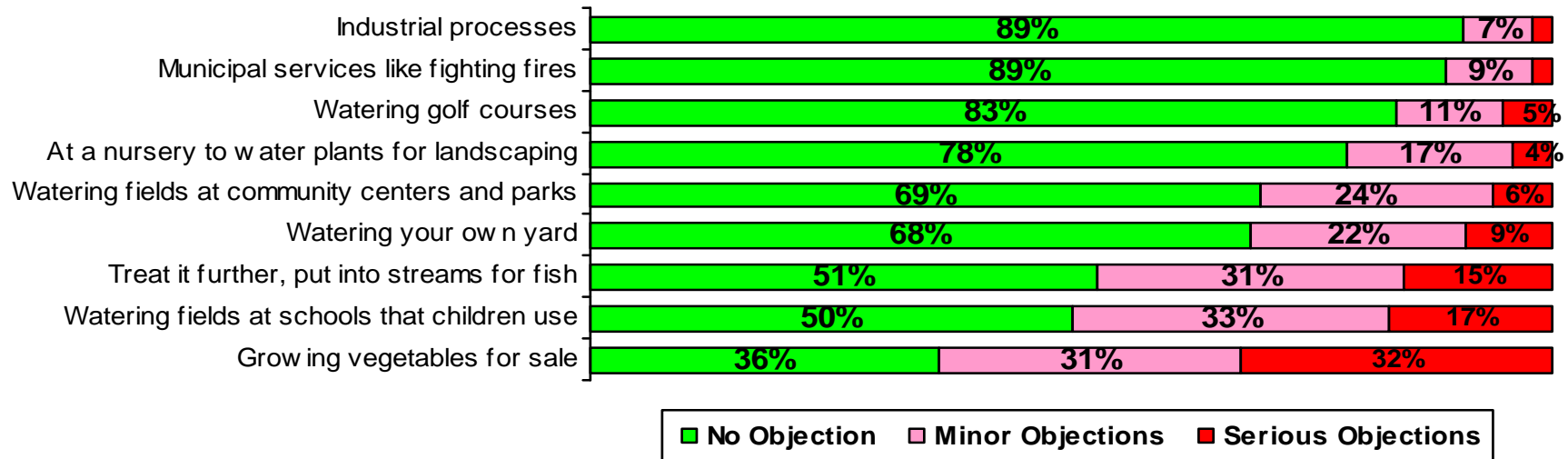
Potential Reclaimed Water Use Areas

Based on Critical Groundwater Recharge Areas and Flow-Limited Streams

Regional Market Analysis Update (continued)

- Water Quality Survey (2007)
 - Gathers input from 400 randomly selected county residents
 - 79% say “reuse as much as possible”

Possible uses for reclaimed water



Regional Market Analysis Update

(continued)

- Focus Groups Highlights
 - Public wants facts about the safety of reclaimed water; once they understand that it is being safely used, people are supportive of using reclaimed water
 - More information about the pricing and financing of reclaimed water infrastructure is desired
 - More communication and education are needed to support reclaimed water use

Regional Market Analysis Update (continued)

- General conclusions
 - Potential for regional reclaimed water use for irrigation may range from 13 to 23 mgd average seasonal day; potential users are dispersed
 - Potential for industrial demand largely unknown; more information needed in this area
 - Identified potential uses were primarily for turf irrigation (golf courses, recreational grounds, cemeteries)
 - Interest in and support for reclaimed water have not significantly changed and have remained generally positive since 1995

Summary of Overall Findings

- Reclaimed water is an effective wastewater management tool
 - Use the resource for preparing and responding to more stringent regulations and climate change
 - Can be used for irrigation purposes, industrial processes, and environmental enhancement while helping limit amount of effluent discharged into the Puget Sound
- Reclaimed water technologies in use and planned for the future are highly effective and appropriate

Summary of Overall Findings

(continued)

- Benefit/cost analysis and tools like the WateReuse Foundation framework should be used to evaluate projects
- Sources of revenue are varied and may be increasing at state and federal levels
- Characteristics of most feasible projects
 - Reclaimed water is requirement or a secondary benefit of new or upgraded wastewater facilities
 - Reclaimed water demand is close to supply
 - Reclaimed water will mitigate or benefit another environmental objective for which others will contribute to costs

Summary of Overall Findings

(continued)

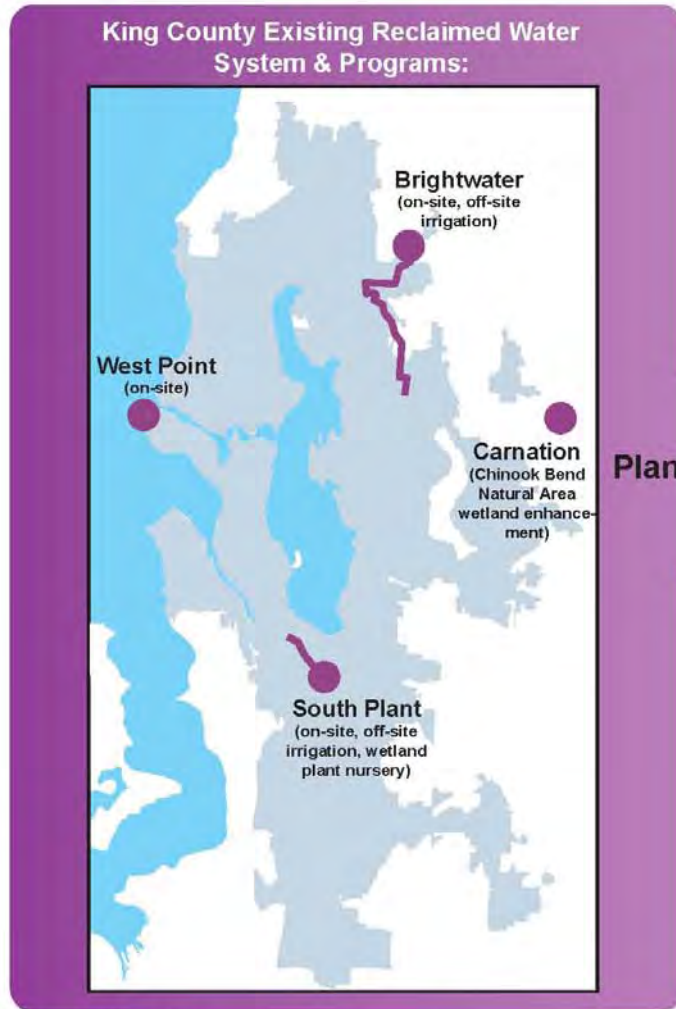
- Public education and research/development are essential to maintain public support for reclaimed water
- A comprehensive reclaimed water plan is needed that identifies and prioritizes water resource management needs for a full range of beneficial uses

Next Steps

- Continue Existing Reclaimed Water Program
- Develop Reclaimed Water Comprehensive Plan
 - Overall Goal: Better manage our water resources by developing a plan that identifies and prioritizes beneficial uses of treated effluent and reduces the amount of effluent discharged to Puget Sound
 - Plan will identify what facilities are needed to serve beneficial uses both near term (next 10 yrs) and long term (next 30 yrs)
 - Plan will analyze environmental, regulatory, legal, social, financial, technical, and managerial issues
 - Policies will be developed to guide implementation and financing of plan

Reclaimed Water: Where Do We Go From Here?

King County Wastewater Treatment Division's
Draft Reclaimed Water Comprehensive Planning Process



Planning for the Future: Serving Potential Uses



Additional
Wetlands
Enhancement



Ground Water
Recharge



Stream Flow
Augmentation



Additional
Industrial Uses



Additional
Irrigation Uses



King County

Department of
Natural Resources and Parks

Wastewater Treatment Division

Last updated on: 4/4/08

Next Steps

Reclaimed Water Comprehensive Plan (continued)

- Robust stakeholder involvement to provide input and advice for consideration throughout planning process
 - Meetings with stakeholders individually, in groups through already existing forums, and through a series of workshops to provide input on:
 - Potential reclaimed water uses
 - Issues the plan should explore/address
 - Policy criteria to guide evaluation process
 - Financing plan, including identifying potential revenue sources and cost allocation
 - Policies to guide implementation and financing of plan

Anticipated Schedule to Complete Draft Reclaimed Water Comprehensive Plan

Project Milestone	Achieved
Develop and initiate a public involvement plan	1 st Qtr 2008 through project completion
Consultant procurement/Notice to Proceed	6/08
Identify reclaimed water plan alternatives for analyses	11/08
Complete SEPA scoping	11/08
Complete analyses of alternatives	9/09
Develop a draft comprehensive reclaimed water plan for review and comment	1 st Qtr 2010
Issue Draft EIS for review and comment	1 st Qtr 2010
Finalize Draft Plan & EIS based on input received	3 rd Qtr 2010
Executive submits Draft Plan to Council for review and adoption	4 th Qtr 2010

Additional Work Outlined in RWSP Water Reuse Policy-5

WRP-5: King County shall implement nonpotable projects on a case-by-case basis. To evaluate nonpotable projects, King County shall develop criteria which will include, but are not limited to: capital, operation and maintenance costs; cost recovery; potential and proposed uses; rate and capacity charge impacts; environmental benefits; fisheries habitat maintenance and enhancement potential; community and social benefits and impacts; public education opportunities; risk and liability; demonstration of new technologies; and enhancing economic development.

RWSP Water Reuse Policy-5 (continued)

A detailed financial analysis of the overall costs and benefits of a water reuse project shall include cost estimates for the capital and operations associated with a project, the anticipated or existing contracts for purchases of reused water, including agricultural and other potential uses, anticipated costs for potable water when the project becomes operational; and estimates regarding recovery of capital costs from new reused water customers versus costs to be assumed by existing ratepayers and new customers paying the capacity charge. Water reuse projects that require major capital funding shall be reviewed by RWQC and approved by the council.